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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte JEONG-JIN KIM, II-RYONG PARK and HAE-JOO CHOI

Appeal 2008-1194
Application 09/727,516
Technology Center 1700

Decided: April 28, 2008

Before THOMAS A. WALTZ, ROMULO H. DELMENDO, and MICHAEL P. COLAIANNI, *Administrative Patent Judges*.

WALTZ, *Administrative Patent Judge*.

DECISION ON APPEAL

This is a decision on an appeal under 35 U.S.C. § 134 from the Primary Examiner's final rejection of claims 4-20, which are the only claims pending in this application. We have jurisdiction pursuant to 35 U.S.C. § 6(b).

According to Appellants, the invention is directed to a method of etching and cleaning objects contained in a vessel comprising the steps of: (1) introducing an etching solution into the vessel from below the objects; (2) etching the objects with the etching solution; (3) introducing a pressurized gas into the vessel from above the objects to force the etching solution out of the vessel from below the objects; (4) cleaning the objects by introducing a cleaning solution into the vessel from below the objects; and (5) draining the cleaning solution from the vessel from above the objects (Br. 6). Independent claim 4 is illustrative of the invention and a copy of this claim is reproduced below:

4. A method of etching and cleaning objects contained in a vessel, comprising the steps of:

introducing an etching solution into the vessel from below the objects;

etching the objects with the etching solution;

introducing a pressurized gas into the vessel from above the objects to force the etching solution out of the vessel from below the objects;

cleaning the objects by introducing a cleaning solution into the vessel from below the objects; and

draining the cleaning solution from the vessel from above the objects.

The Examiner, in addition to the admitted prior art (APA) found in the Specification at pages 1-2 and Fig. 1 (Ans. 2)[1], relies on the following prior art reference as evidence of obviousness:

Yates	6,350,322 B1	Feb. 26, 2002

ISSUE ON APPEAL

Claims 4-20 stand rejected under 35 U.S.C. § 103(a) as unpatentable over the APA in view of Yates (Ans. 3).

Appellants contend that Yates does not disclose or suggest using a gas to drain the wet etchant solution, and only uses an inert gas to purge the vessel after the aqueous etchant (hydrogen fluoride or HF) is discarded (Br. 10 and 12). Appellants further contend that there is no objective evidence supporting the Examiner's allegation that it would have been obvious to purge the wet etchant the same way that the cleaning solution was purged (Br. 11 and 13).

Appellants contend that Yates does not teach how the etching solution is drained out of the rinser, and particularly fails to teach using pressurized gas to force out the etching solution (Br. 12).

The Examiner admits that the APA fails to disclose introducing pressurized gas into the vessel from above the objects, and that Yates does not explicitly disclose how the etching solution is displaced from the vessel (Ans. 3). However, the Examiner contends that it would have been obvious to drain the wet etchant from the chamber in the same manner as the cleaning solution "because otherwise the apparatus would have to be redesigned" at a cost of time and money (Ans. 4). The Examiner also

[1] We rely on and cite from the "Supplemental Examiner's Answer" dated June 11, 2007.

contends that it would have been obvious to force the wet etchant out of the vessel by introducing a pressurized gas because the next step in the method of Yates is introduction of a gas, and thus "it would save time and money to introduce the inert gas while the wet etchant is draining rather than to wait" (Ans. 5).

Accordingly, we determine that the issue presented from the record in this appeal is whether Appellants have shown that the Examiner committed reversible error in combining the APA and Yates to render obvious the limitations of claim 4 on appeal. We determine that Appellants have established that the Examiner committed reversible error in the rejection on appeal, and we thus cannot sustain the Examiner's rejection for the reasons stated in the Brief, as well as those reasons set forth below. Therefore, the decision of the Examiner is REVERSED.

OPINION

There is no dispute that the APA discloses a method of etching and cleaning objects contained in a vessel that is the same as the method recited in claim 4 on appeal, with the exception of the claim 4 step of "introducing a pressurized gas into the vessel from above the objects to force the etching solution out of the vessel from below the objects" (Ans. 3: Br. 9-15). The Examiner also admits that Yates neither explicitly discloses this step of introducing a pressurized gas, nor discloses any method of displacing the etching solution from the vessel (Ans. 3-4; Br. 9). However, as noted above, the issue relates to whether the Examiner has provided sufficient basis in fact and/or technical reasoning to support the allegation that it would have been obvious to one of ordinary skill in the art to drain the wet etchant from the chamber in the same manner as the cleaning solution of Yates "because

otherwise the apparatus would have to be redesigned" to provide a different manner for draining the wet etchant "which costs time and money" (Ans. 4). The Examiner also alleges that it would have been obvious to one of ordinary skill in the art "to force the wet etchant out by introducing a pressurized gas in the method of Yates because the next step in the method of Yates is to introduce a gas, and it would save time and money to introduce the inert gas while the wet etchant is draining rather than to wait" (Ans. 5). We disagree for the following reasons.

We determine that the Examiner has not correctly characterized the method of Yates. In the second embodiment disclosed by Yates relied upon by the Examiner, the process steps include gas etching (or alternatively wet etching), followed by rinsing the semiconductor structure with deionized (DI) water in an inert atmosphere, optionally washing, then the gas etch chamber is purged of any gas that is not inert to the structure before flooding the gas etch chamber with DI water, and a final step of draining the gas etch chamber by displacement of the DI water with the introduction of a gas such as nitrogen (col. 3, ll. 11-33; and col. 6, ll. 25-59). Therefore, contrary to the Examiner's rationale (Ans. 5), "the next step in the method of Yates [after wet etching]" is *not* introduction of a gas but introduction of DI water for rinsing. Additionally, the Examiner has not stated why one of ordinary skill in the art would have introduced a gas to displace the etchant in a first step when an intermediate step taught by Yates purges the chamber of any gas that is not inert, and the final step introduces more inert gas to displace the DI water.

We also determine that the Examiner has not provided any factual support or technical reasoning for the allegation that the wet etchant must be

drained from the chamber in the same manner as the cleaning solution "otherwise the apparatus would have to be redesigned" (Ans. 4). Contrary to the Examiner's rationale (Ans. 4), the introduction of a pressurized gas to displace the wet etchant solution would cost more than merely allowing the wet etchant solution to drain from the chamber using a draining pipe, with use of a draining pipe causing no apparent design change to the apparatus of Yates (*see* Fig. 4 of Yates).

"Where the legal conclusion [of obviousness] is not supported by facts it cannot stand." *In re Warner,* 379 F.2d 1011, 1017 (CCPA 1967). For the foregoing reasons and those stated in the Brief, we determine that the Examiner has not established a proper factual support for a conclusion of prima facie obviousness. Therefore, we cannot sustain the Examiner's rejection of claims 4-20 under § 103(a) over the APA in view of Yates.

The decision of the Examiner is reversed.

REVERSED

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